

What is claimed is:

1. A surface mount circuit protection device comprising:
  - (a) a laminar PTC resistive element having first and second major surfaces and a thickness therebetween;
  - (b) a first electrode layer formed at the first major surface and being substantially coextensive therewith, and comprising a first metal material of a type adapted to be soldered to a printed circuit substrate for effecting surface mounting of the device;
  - (c) a second electrode layer formed at the second major surface and being substantially coextensive therewith; and
  - (d) weld plate means of metal material extending from the second electrode layer and having a thermal mass capable of withstanding resistance micro spot welding of a strap interconnect means without significant resultant damage to the device.
2. The surface mount circuit protection device set forth in claim 1 wherein the second electrode layer is formed as a foil layer, and wherein the weld plate means is formed separately of the second electrode layer and is attached thereto by an attachment layer of electrically conductive material.
3. The surface mount circuit protection device set forth in claim 2 wherein the weld plate comprises nickel.
4. The surface mount circuit protection device set forth in claim 2 wherein the weld plate comprises nickel-plated stainless steel.
5. The surface mount circuit protection device set forth in claim 2 wherein the attachment layer comprises solder.
6. The surface mount circuit protection device set forth in claim 1 wherein the weld plate means includes a raised central mesa region and further comprising an insulative box

surrounding outer edges of the device and defining an opening exposing the central mesa region.

7. The surface mount circuit protection device set forth in claim 1 wherein the weld plate means has a minimum thickness of 0.100 mm.

8. The surface mount circuit protection device set forth in claim 1 wherein the weld plate means has a thickness in a range of 0.100 mm and 0.300 mm.

9. The surface mount circuit protection device set forth in claim 1 further comprising a printed circuit board assembly to which the device is surface mounted and electrically connected.

10. The surface mount circuit protection device set forth in claim 8 wherein the printed circuit board assembly forms a battery protection circuit module and is mounted to and electrically connected to a battery or cell by battery strap interconnects, one of said battery strap interconnects being micro spot welded to the weld plate means.

11. A surface mount circuit protection device comprising:

- (a) a laminar PTC resistive element having first and second major surfaces and a thickness therebetween;
- (b) a first electrode layer formed at the first major surface and being substantially coextensive therewith, and comprising a first metal foil layer enabling the device to be surface mounted by solder to a printed circuit;
- (c) a second electrode layer formed at the second major surface and being substantially coextensive therewith, and comprising a second metal foil layer; and
- (d) a weld plate of metal material secured to the second metal foil layer and having a volume, thickness and thermal mass sufficient to withstand micro spot welding of a strap interconnect means without significant resultant damage to the device.

12. The surface mount protection device set forth in claim 11 wherein the weld plate has an area substantially coextensive with a facing surface area of the second metal foil layer and has a thickness in a range of 0.100 mm and 0.300 mm.

13. The surface mount protection device set forth in claim 11 wherein the weld plate has a thickness of approximately 0.250 mm and wherein the strap interconnect means has a thickness not substantially greater than 0.150 mm.

14. The surface mount protection device set forth in claim 11 wherein the weld plate has a thickness of approximately 0.250 mm and the strap interconnect means has a thickness not substantially greater than approximately 0.250 mm and defines an energy directing opening across which resistance micro spot welds are placed.

15. The surface mount protection device set forth in claim 11 wherein the weld plate comprises one of nickel and nickel-plated stainless steel.

16. The surface mount circuit protection device set forth in claim 11 wherein the weld plate includes a raised central mesa region and further comprising an insulative box surrounding outer edges of the device and defining an opening exposing the central mesa region.

17. A battery protection circuit assembly including a printed circuit substrate, a plurality of electrical components attached to the printed circuit substrate including a surface mounted circuit protection device comprising:

- (a) a laminar PTC resistive element having first and second major surfaces and a thickness therebetween;
- (b) a first electrode layer formed at the first major surface and being substantially coextensive therewith, and comprising a first metal foil layer enabling the device to be surface mounted by solder to a printed circuit;
- (c) a second electrode layer formed at the second major surface and being substantially coextensive therewith, and comprising a second metal foil layer; and

- (d) a weld plate of metal material secured to the second metal foil layer and having a volume, thickness and thermal mass sufficient to withstand micro spot welding of a strap interconnect means without significant resultant damage to the device.

18. The battery protection circuit assembly set forth in claim 17 comprising at least one electrochemical lithium polymer cell, the cell having first and second terminal tabs, wherein at least one of the following conditions applies:

- (a) the first tab comprising said strap interconnect means being micro spot welded to the weld plate, and
- (b) the second tab being connected to circuitry of the printed circuit substrate.

19. The battery protection circuit assembly set forth in claim 17 wherein the weld plate has an area substantially coextensive with a facing surface area of the second metal foil layer and has a thickness in a range of 0.100 mm and 0.300 mm.

20. The battery protection circuit assembly set forth in claim 17 wherein the weld plate comprises one of nickel and nickel-plated stainless steel.